UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/710,526	07/19/2004	Anwar Husen	56.0753	4525

27452 7590 06/25/2007

SCHLUMBERGER TECHNOLOGY CORPORATION
David Cate
IP DEPT., WELL STIMULATION
110 SCHLUMBERGER DRIVE, MD1
SUGAR LAND, TX 77478

EXAMINER	
PLANTE, JONATHAN R	
ART UNIT	**PAPER NUMBER**
2182	

NOTIFICATION DATE	DELIVERY MODE
06/25/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ssitzmann@sugar-land.oilfield.slb.com
pmohan@sugar-land.oilfield.slb.com

Office Action Summary	Application No.	Applicant(s)	
	10/710,526	HUSEN ET AL.	
	Examiner	Art Unit	
	Jonathan R. Plante	2182	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 May 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The instant application having Application Number: 10/710,526 filed on 19 July 2004 (Original) and 09 May 2007 (Request for Continued Examination) has a total of 11 claims pending in the application; there are 1 independent claims and 10 dependent claims, all of which are ready for examination by the examiner.

Oath/Declaration

2. The applicant's oath/declaration has been reviewed by the examiner and is found to conform to the requirements prescribed in **37 C.F.R. 1.63**.

Information Disclosure Statement

3. The information disclosure statement (IDS) submitted on 21 September 2004 has been received. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the Examiner.

Claim Objections

4. Claims 1, 3, and 9 are objected to because of the following informalities:
    a. (Claim 1, Line 3): Please replace "**a base model**" with "the base model" to resolve potential antecedent basis issues with (Claim 8, Line 4) "**a base model**".

b. (Claim 1, Line 7): Please insert "the" before "**predicted performance**" " to resolve potential antecedent basis issues with (Claim 8, Line 6) "**a performance prediction**".

c. (Claim 1, Line 8): Please insert "the" before "**actual performance**" " to resolve potential antecedent basis issues with (Claim 8, Line 7) "**with actual performance**".

d. (Claim 1, Line 8): Please insert "the" before "**calculated predicted performance**" " to resolve potential antecedent basis issues.

e. (Claim 3, Line 2): Please replace "**the system**" with "the model system" for claim completeness.

f. (Claim 9, Line 1): Please insert "includes a" after "**further**" to resolve grammatical issues. The Examiner will interpret the claim as meaning multiples layers of different geological consistencies are used in the model and PVT data for each layer is used.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

6. Claims 1-11 are rejected under 35 U.S.C. 102(a) as being anticipated by Roggero et al. (US Patent 6,662,109 B2 December 9, 2003).

(Claim 8): Roggero et al. discloses, "A method for generating optimized performance data in a subterranean well, comprising the steps of:

a. introducing known pressure transient data, well logging data and PVT data for the well into a base model, **["calculate the derivatives of the main production results (pressure, saturation, flow rate, etc) in relation to the petrophysical properties (permeability, porosity, etc) assigned to zones of a reservoir" (Column 5, Line 58) "** and **"dynamic data are for example production data such as the pressure, the gas-oil ration (GOR) or the fraction of water in the oil" (Column 8, Line 60)]** wherein the PVT data comprises perforation length and height of a fracture; **["a fine geological model representative of the distribution, in a reservoir, of a physical quantity characteristics of the subsoil structure" (ABSTRACT)** and **"Techniques for integrating natural fracturing data into fractured reservoir models are also known in the art. Fracturing data are mainly of a geometric nature and include measurements of the density, length, azimuth and tilt of fracture plane" ("Discussion of the Prior Art", Paragraph 0011)]**

b. producing a performance prediction from the base model; **[parameters of the simulation model are adjusted, this model can be used to simulate the present and future behavior of the reservoir (Column 2, Line 15)]**

c. comparing the performance prediction with actual performance; **[an objective function which measures the difference between the dynamic data observed in the field and the simulation results obtained for a set value of parameters θ (Column 4, Line 30)]**

d. modifying the model to generate a performance prediction that matches the actual performance for producing an optimized model. **[constrained reservoir characterization is to determine the parameters of the simulation model so that the latter can reproduce the production data of the reservoir to be modeled. This parameter estimation stage is also referred to as production data fitting. The flow simulation model is thus compatible with all of the available static and dynamic data (Column 1, Line 61)]**.

Examiner Note: ***The Examiner directs applicant to "Response to Arguments" in Final Rejection Mailed 09 February 2007 in respect to PVT data and the Examiner interpretation:***

In response examiner refers to the applicants own disclosure in the Discussion of the Prior Art "Characterizing a well during operations relating to creating or operating the well can provide various information about what is downhole in the well or adjacent subterranean formations. This information may be used in performing the operation(s) on the respective well, or it may be useful *in planning or conducting operations on other wells*. Such information includes, for example, structural information (e.g., what objects are downhole, locations of what is downhole, and events that occur downhole) and *information (e.g., pressure, temperature and parametric flow rate)*." (Paragraph 0016). Applicant has disclosed in the Discussion of the Prior Art that the use of pressure, temperature and parametric flow rate is prior art and at the time

of the invention was being used in the planning or conducting of operations at other wells. Expanding the acronym PVT to represents Pressure, Volume, and Temperature it is apparent that the prior art disclosed by applicant includes pressure, temperature, and also volume as a calculation requirement for the determination of a flow rate (Flow Rate = Volume / Time). As a result applicant has acknowledged that the usage of PVT data was prior knowledge in the art. Roggero also discloses the usage of PVT data with **"By way of example, it is possible to calculate the derivatives of the main production results (pressure, saturation, flow rate, etc) in relation to the petrophysical properties (permeability, porosity, etc) assigned to zones of a reservoir" (Column 5, Line 58)**.

Additionally the examiner refers to applicant's ability to be their own lexicographer with reference to **"The PVT data, which heretofore has largely ignored in modeling schemes, includes fluid properties existing at the well, i.e., properties by which reservoir fluid can be characterized. This can be either blackoil or compositional. Blackoil means that he properties are given in terms of oil, water or gas. This takes into account the non-Darcy fluid characteristics and provides the required input to modify and optimize historic models, thereby permitting the optimization of performance predictions in the instant invention." (Paragraph 0043).** Applicant has by example of Blackoil defined the PVT data to be inclusive of the properties given in terms of oil, water, or gas. Roggero clearly discloses/incorporates these properties with **"The dynamic data are for example production data such as the pressure, the gas-oil ratio (GOR) or the fraction of water in the oil" (Column 8, Line 60)**.

(Claim 9): Roggero et al. discloses, "wherein the PVT further [sic] number of layers involved in the well modeled." as **["a fine geological model representative of the distribution, in a reservoir, of a physical quantity characteristics of the subsoil structure" (ABSTRACT), "The geostatistical models used to represent the geologic structure of the reservoir" (Column 1, Line 50)** and **"Seismic data is commonly used for acquiring information about subsurface structures. Changes in the elastic properties of**

subsurface rocks appear as seismic reflections. Such changes in the properties of the rocks typically occur at boundaries between geologic formations, at fractures and at faults." ("Discussion of the Prior Art", Paragraph 0004)]

Examiner Note: ***The Examiner has additionally refers to Figures 4, 11 and 13 that depict a geostatistical model that displays changes in permeability which as a result also depicts changes in the subsoil structural characteristics that represent differing levels of geological material.***

(Claim 10): Roggero et al. discloses, "wherein optimized model is generated by comparing the performance prediction and actual performance for a first, known zone" **[rejected using the same rationale as per the rejection of claim 1]** "optimized model is utilized to predict performance data for an unknown zone" **[Characterizing a well during operations relating to creating or operating the well can provide various information about what is downhole in the well or adjacent subterranean formations. This information may be used in performing the operation(s) on the respective well, or it may be useful in planning or conducting operations on other wells. (0016)].**

(Claim 11): Roggero et al. discloses, "wherein the model is repeatedly optimized as actual performance data for multiple zones is collect" **[A flow simulation is**

carried out for a 42-day period on the reference geostatistical model. The synthetic pressure history (FIG. 12) is defined from the results of this reference simulation by the production well bottomhole pressure, its derivative in relation to time and the bottomhole pressure of the four observation wells (Column 15, Line 62)].

(Claim 1): Roggero et al. discloses, "The method of Claim 8, the method utilizing a model system comprising:

a. a base model **[The simulation model is preferably first calibrated (Column 8, Line 42)]**

b. an input device for inputting well logging data into the base model; **["allows updating by the dynamic production data, a fine geological model representative of the distribution in the reservoir of a physical quantity characteristic of the subsoil structure (the permeability or the porosity of the reservoir rocks for example)" (Column 8, Line 8), "dynamic data are for example production data such as the pressure, the gas-oil ration (GOR) or the fraction of water in the oil" (Column 8, Line 60)]**

c. an input device for inputting pressure transient data into the base model; **["dynamic data are for example production data such as the pressure, the gas-oil ration (GOR) or the fraction of water in the oil" (Column 8, Line 60)]**

d. an input device for inputting PVT data into the base model; **["allows updating by the dynamic production data, a fine geological model representative of**

the distribution in the reservoir of a physical quantity characteristic of the subsoil structure (the permeability or the porosity of the reservoir rocks for example)" (Column 8, Line 8),"dynamic data are for example production data such as the pressure, the gas-oil ration (GOR) or the fraction of water in the oil" (Column 8, Line 60), Figures 2, **3**, and **5]**

e. a numerical interpreter for calculating predicted performance of the well; **[parameters of the simulation model are adjusted, this model can be used to simulate the present and future behavior of the reservoir (Column 2, Line 15)** and **"power of current computers" (Column 2, Line 41)]**

f. a match system for comparing actual performance data with calculated predicted performance data based on the base model; and **[an objective function which measures the difference between the dynamic data observed in the field and the simulation results obtained for a set value of parameters θ (Column 4, Line 30)]**

g. a reiterative loop for modifying the base model to provide a match between the actual performance data and the predicted performance data to optimize the base model **[constrained reservoir characterization is to determine the parameters of the simulation model so that the latter can reproduce the production data of the reservoir to be modeled. This parameter estimation stage is also referred to as production data fitting. The flow simulation model is thus compatible with all of the available static and dynamic data (Column 1, Line 61)]**.

Examiner Note: ***The Examiner directs applicant to "Response to Arguments" in Final Rejection Mailed 09 February 2007 in respect to input device and the Examiner interpretation:***

It is also noted by the examiner that the applicant has agreed that Roggero is entering/inputting properties/characteristics of the subsoil structure. Examiner also refers to **Figures 2, 3,** and **5** that show the inputting of **"Dynamic data"** into the model. The examiner also refers to Figures 11, 13, and 16 that are generated 3D geostatistical models/simulations resulting from the entering/inputting of data into a numerical device (computer). Roggero further discloses the usage of computers with **"Computer Implementation" (Column 11, Line 34)**. It is also inherent in the application of a model or simulation that data is entered into a system/device/equation that represent what is to be modeled. The input device can be as simple as a pencil for writing variables into a set of equations on a piece of paper or using a keyboard/digital device to enter/load data onto a mainframe. The examiner additionally refers to applicants "Disclosure of the Prior Art" the usage and application of computer is the application of reservoir modeling/simulation with **"The computer time roughly increases as the square of the number of nodes in the model and the models must be continuously interacted with by the user to put in new faults as they are believed to have occurred." (Paragraph 0013)** and as a result it is inherent that the user is using some device to interact with the computer.

(Claim 2): Roggero et al. discloses, "further including a data editing module for editing the pressure transient data before it is input into the base model" **[as the parameters of the simulation model are adjusted, this model can be used to simulate the present and future behavior of the reservoir (Column 2, Line 16)].**

(Claim 3): Roggero et al. discloses, "further including a plotting device for plotting the data generated by the system" **[Figures 4 – 7, 10-16, 18-20].**

(Claim 4): Roggero et al. discloses, "wherein the plotting device is adapted for plotting line fitting on specialized plots" **[FIGS. 19A to 19E show comparison between the pressure data and the simulation results after fitting (Column 10, Line 7)].**

(Claim 5): Roggero et al. discloses, "wherein the plotting device is adapted for plotting specialized plots providing preliminary estimates of performance data based on the base model" **[FIG. 13 shows an initial geostatistical model (Column 9, Line 61)]**.

(Claim 6): Roggero et al. discloses, "wherein the plotting device is adapted for generating a 3D display of the well" **[FIG. 16 shows a constrained geostatistical model (Column 10, Line 1)]**.

(Claim 7): Roggero et al. discloses, "wherein the plotting device is adapted for generating performance data plots based on the optimized model" **[FIG. 4 shows the derivatives of the simulation results in relation to the parameterization of the geostatistical model (Column 9, Line 43)]**.

Conclusion

7. The examiner requests, in response to this Office action, support be shown for language added to any original claims on amendment and any new claims. That is, indicate support for newly added claim language by specifically pointing to page(s) and line number(s) in the specification and/or drawing figure(s). This will assist the examiner in prosecuting the application.

When responding to this office action, Applicant is advised to clearly point out the patentable novelty which he or she thinks the claims present, in view of the state of the art disclosed by the references cited or the objections made. He or she must also show how the amendments avoid such references or objections See 37 CFR 1.111(c).

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan R. Plante whose telephone number is (571) 272-9780. The examiner can normally be reached on Monday -- Thursday 10:00 AM to 4:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim Huynh can be reached on (571) 272-4147. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

9. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

June 11, 2007
JRP

Jonathan R. Plante
Art Unit 2182

6/14/07